

FACTORS THAT MIGHT CONTRIBUTE TO HIGHER SYMPTOM RATES SOMETIMES OBSERVED AROUND HAZARDOUS WASTE SITES

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Symptom surveys around hazardous waste sites often show higher rates of symptoms in waste-site neighborhoods than in nearby control neighborhoods. Many processes may contribute to such results, and their role should be considered in each case. Each factor is discussed, and examples of each are presented: (1) classical toxicological response, (2) immunological or other physiogenic "dumpsite syndrome," (3) behavioral sensitization, (4) psychosomatic reaction to stress, (5) mass hysteria, (6) reporting bias, (7) confounding factors, and (8) odor as an effect modifier. It would be expensive to conduct exposure assessment and epidemiology to disentangle psychological and physical factors. A description of the desiderata of such second generation studies is provided.

CANCER AMONG FARMERS IN ICELAND

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The purpose of this study was to describe the cancer pattern in a cohort of farmers in Iceland and to compare their cancer incidence to that of other Icelandic males. Special attention was given to hematological malignancy. This was a retrospective cohort study. The study population was obtained from a register at the Farmers' Pension Fund and comprised 5,922 subjects. Through date of birth and the personal identification number, the study population was linked with the Icelandic Cancer Register, which has records of cancer incidence in Iceland. The expected number of deaths were calculated using person-years of observation within 5-y age categories during respective single calendar years of the study period, multiplied by the cause and calendar-year-specific cancer incidence rates for Icelandic men. A standardized morbidity ratio (SMR) was calculated with 95% confidence intervals.

The entire cohort shows a lower incidence for all tumors than expected. The same is true for SMRs for cancer of colon, lung, prostate, bladder and other urinary organs: 47, 41, 71, and 51, respectively. There was a significant excess incidence for Hodgkin's disease and excess for cancer of lips and skin (excluding melanomas), nervous system, and non-Hodgkin's lymphoma. There was also an excess incidence of leukemia.

The climate in Iceland is polar maritime, and grain farming is almost nonexistent. Most farmers raise either sheep or cattle or both, and haymaking occupies the farmers in the summer. It is, therefore, interesting to find similar patterns in the incidence of cancer as have been found in mortality studies of farmers who live in warmer climates.

EFFECTS OF SOCIOECONOMIC STATUS AND SMOKING ON SERUM BETA-CAROTENE

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Levels of serum beta-carotene were examined in persons who lived in Wellington, New Zealand, and a gradient of lower levels of beta-carotene with lower levels of socioeconomic status was observed. This probably reflects lower dietary intake of beta-carotene in these individuals. It might also be explained by the fact that low levels of serum beta-carotene occur in cigarette smokers (independent of diet), and cigarette smoking is more common in persons of low socioeconomic status.

Socioeconomic status*	1	2	3	4	5	6
n	107	369	505	260	189	59
Mean (µg/dl)	77.2	73.5	73.9	61.9	61.0	57.1
SE (µg/dl)	4.0	1.9	2.0	1.8	2.5	3.3

*Classification system of the British Registrar General, 1-6 = high to low.

However, when this finding was examined separately for smokers and for nonsmokers and ex-smokers combined, a gradient by socioeconomic status was present for both groups. Numerous studies have suggested that increased dietary intake of beta-carotene may protect against the development of cancer of the lung, stomach, and esophagus. The incidence of lung, stomach, and esophageal cancers is increased among persons of lower socioeconomic status. Increased

rates of smoking among individuals of lower socioeconomic status explain part of these differences.

The data reported herein suggest that a socioeconomic gradient exists for dietary intake of beta-carotene, independent of smoking. The gradient may also help to explain differences in cancer incidence by socioeconomic status.

Future studies of beta-carotene and cancer should be designed to consider the complex relationships between dietary beta-carotene, serum beta-carotene, cigarette smoking, socioeconomic status, and the development of cancer.

CHARACTERISTICS OF THE URINARY COTININE LEVEL IN A POPULATION OF CONTROLS FROM A CASE-CONTROL STUDY OF PEDIATRIC ASTHMA AND EXPOSURE TO ENVIRONMENTAL TOBACCO SMOKE

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Recent exposure to environmental tobacco smoke (ETS) was assessed in a case-control study of pediatric asthma in inner-city children who were 3-14 y old. Cotinine and creatinine levels were measured in the urine of 116 nonasthmatic controls who presented to our hospital's emergency room. Analyses were undertaken of both the urinary cotinine level (UC) and the cotinine-creatinine ratio (CCR); for categorical analyses, a CCR of 30 ng/mg or greater was considered to be indicative of recent ETS exposure.

The mean cotinine level was 44.9 ng/ml, with a standard deviation of 69.3 ng/ml. The median level was 21.5 ng/ml. The skewness coefficient was 3.0. The upper quartile was among those with levels 62 ng/ml or greater; the highest decile began at 131.5 ng/ml. The maximum level observed was 360 ng/ml. The mean CCR was 47.1 ng/mg, with a standard deviation of 102.3 ng/mg. The median level was 15 ng/mg; reflecting the skewed nature of the data, the skewness coefficient was 5.3. The upper quartile began at 49 ng/mg, and the highest decile ranged from 94.3 ng/mg to 745 ng/mg.

Concerns regarding the effect of varying levels of diuresis in the population led us to focus our analysis on the CCR. The skewed nature of the distribution suggested that a log-transformation would assist in our analysis. The CCR was found to strongly correlate with the level of maternal smoking in the home ($p < .01$). No relationship was found between the CCR and sex, age, hour of day, or race. We conclude that CCR is an easily used indicator of ETS exposure.

EXPOSURE ASSESSMENT FROM OCCUPATIONAL AND NONOCCUPATIONAL SOURCES BY AN INDUSTRIAL HYGIENIST FOR BIRTH DEFECTS RESEARCH

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Occupational and other environmental exposures during pregnancy are often similar; some of these exposures may be teratogenic. In epidemiologic studies of birth defects, occupational titles have frequently been used as surrogates for exposure. To avoid the error associated with such proxy exposure measures, we have designed a process which allows an industrial hygienist who is blinded to case or control status to systematically impute exposures derived from maternal interview responses. This process allows for either separate or simultaneous assessment of maternal occupational and nonoccupational exposures. The process first requires mothers of cases and controls to recall occupational and nonoccupational tasks performed or products used around conception in response to a structured questionnaire. Maternal exposures are then determined a priori defined categorical levels by an industrial hygienist using a standard set of rules. One level entails a listing of 72 chemical-family groups (e.g., alcohols, ketones), to which each woman's recalled events are considered yes, no, or maybe. Several other categorical exposure levels are also pre-defined and considered, e.g., product function groups such as insecticides or combustion products. A detailed description of this approach and its exposure assessment potential, using interview data from approximately 200 women, will be presented.

TAP OR BOTTLED WATER CONSUMPTION AND SPONTANEOUS ABORTION: A 1986 CASE-CONTROL STUDY IN CALIFORNIA

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We investigated earlier findings that drinking bottled water or abstaining from tap water during pregnancy lowers the risk of spontaneous abortion (SAB). In a case-control study, approximately 2,000